

Appln No. 10/815,526
Amdt date September 28, 2007
Reply to Office action of August 2, 2007

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) Process for forming a protective coating containing aluminium on the surface of a metal substrate in which the said substrate and a non-gaseous precursor containing aluminium are placed in contact, at a high temperature, with an atmosphere containing an active gas which reacts with the precursor to form a gaseous aluminium compound which decomposes on contact with the substrate depositing aluminium metal thereon, characterised in that the said atmosphere contains a gaseous compound of a modifier metal which decomposes on contact with the substrate and deposits the said modifier metal thereon simultaneously with the deposition of aluminium.
2. (Original) Process according to claim 1, in which the said modifier metal is selected from zirconium, hafnium and yttrium.
3. (Original) Process according to claim 1, in which the said active gas at least in part comprises the said gaseous compound.
4. (Original) Process according to claim 2, in which the said active gas at least in part comprises the said gaseous compound.
5. (Original) Process according to claim 3, in which the said active gas solely comprises the said gaseous compound.
6. (Original) Process according to claim 3, in which the said active gas also contains at least one ammonium compound.

7. (Original) Process according to claim 1, in which the said active gas and/or the said gaseous compound are formed by the vaporisation of at least one substance which is solid at ambient temperature mixed with the said precursor.
8. (Original) Process according to claim 1, in which the substrate contains at least one element which combines with the aluminium to form an intermetallic compound within the coating in which the aluminium is partly substituted by the modifier metal.
9. (Currently Amended) Process according to claim [[7]] 8, in which the said element of the substrate is nickel and the said intermetallic compound is β -NiAl.
10. (Original) Process according to claim 1, in which the substrate is a nickel-based superalloy.
11. (Original) Process according to claim 1, in which the said active gas and/or the said gaseous compound contain at least one halogen.
12. (Original) Process according to claim 10, in which the said gaseous compound is at least one compound selected from $ZrCl_4$, $ZrOCl_2$ and $(NH_4)_2ZrF_6$.
13. (Original) Process according to claim 11, in which the said active gas contains at least one compound selected from NH_4Cl , NH_4F and NH_4F , HF .
14. (Original) Process according to claim 12, in which the said active gas contains at least one compound selected from NH_4Cl , NH_4F and NH_4F , HF .
15. (Original) Process according to claim 1, in which the said precursor is an alloy of aluminium and chromium.
16. (Original) Process according to claim 1, in which the substrate and the precursor are at a distance from each other.

17. (Original) Process according to claim 16, in which the substrate is located above the precursor.
18. (Original) Process according to claim 1, in which the substrate and the precursor are in contact.
19. (Original) Process according to claim 1, in which the substrate and the precursor are located in an enclosure permitting only limited exchanges with the exterior.
20. (Currently Amended) Process according to claim 1, in which in addition to the active gas and the gaseous compound the said atmosphere comprises an inert or reducing gas ~~and preferably hydrogen~~.
21. (Original) Process according to claim 1, in which the modifier metal ~~element~~ is present in the said protective coating in a concentration by mass of less than 0.5%.
22. (Currently Amended) Process according to claim 21, in which the said concentration by mass lies ~~between~~ at or above 500 ppm and below 1000 ppm ~~and is preferably approximately 800 ppm~~.
23. (Currently Amended) Process according to claim 1, in which the said high temperature ~~lies between 950 and 1200°C and is preferably approximately~~ is about 1080°C.
24. (New) A method for forming a protective coating containing aluminium on a surface of a metal substrate, the method comprising:
 - placing the metal substrate and a non-gaseous precursor containing aluminium in contact, at a high temperature, with an atmosphere containing an active gas;
 - reacting the atmosphere containing the active gas with the non-gaseous precursor containing aluminium to form a gaseous aluminium compound;

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decomposing the gaseous aluminum compound on contact with the metal substrate and depositing aluminium metal on the metal substrate, wherein the atmosphere further comprises a gaseous compound of a modifier metal; and

decomposing the gaseous compound of the modifier metal on contact with the metal substrate and simultaneously depositing the modifier metal on the metal substrate with the depositing of the aluminium metal.

25. (New) The method of claim 24, wherein the active gas consists of the gaseous compound of the modifier metal.